TC-80-01

An Evaluation of the Audio Teleconferencing Demonstration Project at MTC

Ontario

Ministry of
Transportation and
Communications

Policy
Planning and
Research Division

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Human and Social Systems
Research and Development Branch

December 1980

Published by:
The Policy Planning and Research Division
Ontario Ministry of Transportation and Communications
Hon. James W. Snow, Minister
H.F. Gilbert, Deputy Minister

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Printed February 1981

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ACKNOWLEDGEMENTS

The author gratefully acknowledges the contribution of the members of the MTC Teleconferencing Task Force for their efforts both in the management of the Audio Teleconferencing program and in this evaluation. The members of the Task Force are:

Shanker Sanyal - Communications (Project Leader)
Harry George - Special Services
Terry Parr - Special Services
Paul Gorys - Human and Social Systems

Appreciation is extended to Brian Deslauriers for his review of this report and early involvement in the program as a Task Force member, and to Wendy Cukier - TEMP Teleconferencing Coordinator for her review of this report.

Special thanks are extended to the regional coordinators for their continued support and efforts in the program, in particular: Bill Smyth - Southwestern Region; Myrna Donolovitch - Northwestern Region; Joanne Sheppard - Central Region; Fay McNeil - Northern Region; and Linda Reid - Eastern Region.

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1/ FOREWORD

In 1977, a demonstration project was begun to examine the potential for substituting teleconferencing for travel within the Ontario Ministry of Transportation and Communications. Travel is costly of both time and money, especially for a large geographically diverse organization such as the Ministry. The Ministry has 11,000 employees located at Head Office, 5 Regional Offices and over 20 District Offices.

Reducing travel and improving communications are two reasons for the wide interest in teleconferencing. Another reason for the interest in teleconferencing comes from the uncertain domestic and world oil situation. Road and air transportation in Ontario is virtually 100% dependent on oil-based energy. In addition to reducing energy requirements, teleconferencing also substitutes electric energy for oil-based energy. Based on preliminary demonstration findings and in recognition of the potential for teleconferencing to save transportation energy, audio teleconferencing formally became one of the program areas of the Transportation Energy Management Program (TEMP). In 1980, a TEMP Teleconferencing Task Force was formed to promote the use of audio teleconferencing within the Ontario Government and the private sector.

Teleconferencing is defined as "any situation where three or more individuals communicate simultaneously as a group, over an electrical telecommunications channel".[1] Teleconferencing can be as simple as adding a third party to a normal telephone conversation or as complex as involving various video systems or even utilizing computers. Based on the Ministry's needs an audio system was implemented throughout the Ministry. In this system a Dedicated Network was established linking Head Office,

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[1] Hough, R.W. Teleconferencing System: A State-of-the-Art Survey and Preliminary Analysis, p.1.

Queen's Park and the Regional Offices. Head Office also has a Conference 2000R* unit installed and some Speakerphones. All five Regional Offices have a SpeakerphoneR*. Teleconferencing is also possible through use of the regular telephone network.

For further information about the MTC Audio Teleconferencing demonstration project, contact Shanker Sanyal (248-3567). For information about audio teleconferencing and assistance in designing and implementation of teleconferencing, contact:

TEMP Teleconferencing Task Force
Ministry of Transportation and Communications
East Building
1201 Wilson Avenue
Downsview, Ontario
Telephone: 248-3567

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* descriptions and pictures of these devices are given in the Appendix

Speakerphone and Conference 2000 are Registered Trade Marks

2/ EXECUTIVE SUMMARY

2.1/ Purpose

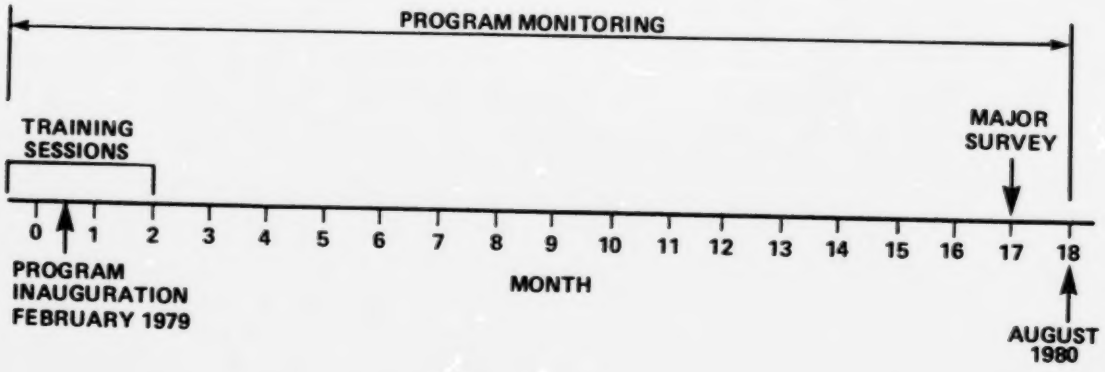
This study was undertaken to determine the use of audio teleconferencing and assess the relative success of the Audio Teleconferencing demonstration project within the Ministry in its first 18 months of operation. The relative success of the teleconferencing program is to be measured against the overall objectives of the Ministry program. These objectives are:

(1) to reduce travel cost;
(2) to improve information exchange and management efficiency;
(3) to obtain empirical evidence of energy savings attainable through substitution of teleconferencing for travel; and
(4) to gain experience with teleconferencing as a technique in the Ontario Government.

This evaluation is comprised of three separate components:

(1) an evaluation of the training sessions;
(2) a survey of users and potential users; and
(3) an examination of systems usage in the 18 month experimental period.

Following is a schedule of events in the evaluation of the Audio Teleconferencing demonstration project.


PROGRAM MONITORING
TRAINING SESSIONS
MAJOR SURVEY
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
MONTH
PROGRAM INAUGURATION FEBRUARY 1979
AUGUST 1980

2.2/ Methodology

The training sessions were evaluated by completing a questionnaire at the end of a training session by attendees. The questionnaire was designed to determine potential usage of teleconferencing, attitudes towards teleconferencing and a participant assessment of the training session itself.

The second component of the evaluation was a survey of 279 users and 89 non-users. This survey took the form of a self-completion mail survey. The focus of this component of the evaluation was to determine potential use, actual use and to obtain feedback on user satisfaction with teleconferencing.

The third component of this evaluation was an analysis of data compiled on systems usage to the end of the 18 month experimental period.

2.3/ Evaluation Results

2.3.1/ Survey of Training Session Attendees

In general, there was a favourable opinion of the presentation and participants were satisfied with the presentation format. A potential for teleconferencing was identified. Specifically, some of the major findings are:

- almost all of the participants felt the training sessions increased their awareness and knowledge of teleconferencing,
- the hands-on demonstration of equipment was a valuable component of the training session,
- there was some problem with respect to session attendance. It is desirable to develop a strategy which is more effective in reaching the real potential user, and
- about 34% of the training session participants have used teleconferencing (based on empirical results).

2.3.2/ Survey of Users and Potential Users

Some of the major findings of this component of the study are:

Knowledge-Awareness

- In general, survey participants have only a moderate awareness or knowledge of how to conduct a teleconference utilizing different teleconferencing equipment; non-users generally have a lower knowledge of various teleconferencing equipment than do users; and, for both groups, there was relatively a high awareness of who to contact for more information on teleconferencing.

Potential Usage/Reported Usage of Teleconferencing (Survey Results)

- There is potential for increased usage of teleconferencing; participants expressed that encouraging use could be accomplished primarily by providing more information or detailed instruction, increasing needs and ensuring greater accessibility of equipment.
- Several participants have utilized more than one method of teleconferencing; of the 279 surveyed users, 253 people have used the Dedicated Network; 62 people have used either a Speakerphone or Conference 2000; and 40 people have used their standard desk phone for the purpose of making a conference call.

User Reactions: Advantages and Disadvantages of Teleconferencing

- The main advantages of all methods of teleconferencing were identified as:
  (1) reducing travel; (2) shorter meeting time;(3) more staff attending meetings; and (4) reaching a decision or consensus more rapidly.
- The main disadvantages of all methods of teleconferencing were identified as: (1) loss of face-to-face contact and non-verbal communication; (2) unsuitability for all meeting types;(3) more meetings required to complete business; and (4) more stressful or tiresome meetings.

- While respondents specifically expressed that teleconferencing has made little impact on their operations or organizational efficiency, they felt it has improved information exchange and management efficiency.
- Over 96% of users expressed satisfaction with teleconferencing as a means of communication.
- Approximately 90% of users expressed satisfaction with the equipment and transmission.

2.3.3/ Usage of Teleconferencing (Empirical Results)

- Over the 18 month experimental period ending on 1980-08-31 there were 384 known users of audio teleconferencing; 51.5% have teleconferenced more than once and about 10% are frequent "users" with more than 5 teleconferences in the 18 month period.
- Some characteristics of teleconferencing methods are given below:

Method	Number Tele-conferences	Average Number of Locations	Average Number of Participants	Average Duration (Hours: Minutes)	Proportion that Substituted for Travel	Total Estimated Fuel Savings (Litres)
Dedicated Network	86	5	11	2:12	88%	42 098
*Conference 2000	14	2	5	0:45	43%	1 124
*Speaker-phone	24	2	4	0:20	8%	392
*Telephone	6	N/A	N/A	0:37	N/A	N/A

*Evidence suggests that even greater usage of these methods is taking place than is actually reported. Difficulties in the monitoring of these methods is the major reason for being unable to provide more complete and accurate information.

- It is estimated that the Dedicated Network teleconferences have resulted in a net dollar savings of 23% when comparing teleconferencing charges and estimated travel savings (incorporating direct costs, "savings", such as transporation cost, accommodation costs and meal allowance, and not incorporating indirect costs such as estimates of employee travel time) and 54% when travel time is accounted for.

A benefit/cost summary of three teleconferencing methods is presented below. Determination of teleconferencing costs and savings for the standard desk phone are unobtainable.

Toll Costs ($)	Total Costs ($)	Direct Savings: Transportation Savings($)	Indirect Savings: Travel Time Avoided($)	Total Estimated Travel Savings ($)	Benefit/ Cost Ratio
1/Dedicated Network					
7 630	43 652	56 664	37 071	93 735	2.15:1
2/Conference 2000					
*	852	1 866	990	2 856	3.35:1
3/Speakerphone					
*	1 155	958	432	1 390	1.20:1

*Conference 2000 and Speakerphone usage does not include toll charges as usage over the government tie lines incur no toll cost; when used over the regular network and not through the Conference Operator, charges are direct Long Distance charges. Due to difficulties in obtaining this information, these changes are not available.

1/Total costs include toll, rental, installation, purchase and amortization costs, where applicable.

2/Direct savings include actual transportation costs, accomodation costs and meal allowance.

3/Indirect savings represent a dollar estimate of the total employee time indirectly saved as a result of avoiding travel.

The Audio Teleconferencing program can be considered relatively successful when measured against the overall objectives of the program.

1/ Teleconferencing has reduced travel cost. This is especially important as the cost of travel and accommodation increases. There is greater potential for the benefit/cost ratio to increase in favour of benefits as experience shows that these factors increase more rapidly than toll charges and equipment rental. An important component of cost is the measure of time and associated cost of people spent in travel to meet ings. Teleconferencing has resulted in travel time savings and actual meeting time savings. Also, as a result of less time being spent away from the office, management time is utilized more productively.

2/ Teleconferencing has improved information exchange and management effeciency. This is of key importance in a geograhically dispered organization like the Ministry where reliable communications are very important to provide a necessary link between centres. Factors mentioned which contribute to improved information exchange and management efficiency are: simultaneous discussion by all parties; on top of issues quicker (short notice); increased time spent on the job; readily teleconference - have more meetings (meetings where travel is hard to justify); more staff able to attend meetings fuller representation with local experts and resources; more direct discussion, more organized and efficient meetings. This last factor was considered to be the main advantage of teleconferencing. Also important is that there has been a positive reaction to teleconferencing, especially among senior staff.

3/ Through system monitoring, empirical evidence of energy savings attainable through substitution of teleconferencing for travel have been obtained. In the 18 month experimental period teleconferencing via the Dedicated Network system has resulted in an estimated transportation energy savings of 42 098 L (Car-10 930 L, Air-31 168 L). The total estimated fuel savings for all teleconferencing methods was 43 614 L (Car-11 168 L, Air-32 446 L).

4/ The program has enabled MTC to gain experience with teleconferencing as a technique in the Ontario Government. As a result of the success of the program, expansion is underway to include several other Ontario Provincial Ministries. Further plans are being formulated to promote the program in the private sector.

The various teleconferencing methods available at MTC seem to complement each other and provide a range of teleconferencing options. The range of meeting types has been broad and have included problem solving, information exchange, briefings or coordination of related activities. Although impromptu meetings are held, most of these meetings are regularly scheduled and in most cases users know each other well. Most participants are also senior level management. Overall, audio teleconferencing has been a positive introduction in the Ministry's operations.

2.4/ Recommendations

Based on MTC's experience with audio teleconferencing in the 18 month experimental period, it is recommended that Audio Teleconferencing be installed as a regular, ongoing service under the following conditions:

(1) the existing equipment and services be retained;
(2) continuance of program monitoring with participation of the Special Services Office be conducted for an additional period of one year;
(3) continuance of an awareness and promotional program; and
(4) examination and review of possible future expansion of audio teleconferencing facilities within MTC, the need and justification to be demonstrated to the Special Services Office.

3/ STUDY BACKGROUND

3.1/ Introduction

In 1977, a project was initiated to examine the potential for substituting teleconferencing for travel within the Ontario Ministry of Transportation and Communications. The overall objectives of the teleconferencing program are:

1/ to reduce travel cost;
2/ to improve information exchange and management efficiency;
3/ to obtain empirical evidence of energy savings attainable through substitution of teleconferencing for travel; and
4/ to gain experience with teleconferencing as a technique in the Ontario Government.

Two studies were undertaken in June and July 1978 in order to gain an insight as to the potential use or usefulness of teleconferencing. An examination of travel records provided objective quantifiable data on travel patterns and trip expenditure. A subsequent telephone survey was conducted to determine characteristics of meetings, existing use and satisfaction with present communication channels, attitudes towards teleconferencing, and the perceived use of teleconferencing.

The studies revealed a potential for teleconferencing. As a result a variety of teleconferencing methods are available throughout the MTC:

1/ conference calling via the Bell Canada conference operator is available Ministry wide;
2/ Speakerphones are available in Regional Offices;
3/ a Conference 2000 unit is situated at Head Office;
4/ the Regional Offices, Queen's Park, and Head Office are linked by means of a Dedicated Network utilizing the CNCP Broadband Communications Network.

The overall program was structured so as to promote teleconferencing and make the system attractive for the user. Training sessions were conducted in order to inform and instruct potential users. Coordinators were appointed at all Regions and Head

Office. Their duties included assisting in organizing teleconferences, equipment set-up, answering general questions and liasing with the MTC Teleconferencing Task Force. A specialized monitoring system was developed to monitor teleconferencing usage, costs, satisfaction, and alert staff to technical problems.

This study was undertaken to determine the relative success of the Audio Teleconferencing program at the Ministry by evaluating the training sessions and determining actual systems usage in the program's first 18 month period, as well as obtaining feedback from users and potential users of audio teleconferencing.

4/ TRAINING SESSIONS

4.1/ Introduction

The teleconferencing training sessions were an important means whereby potential users of audio teleconferencing could be informed and educated about the various teleconferencing methods which are available to them within the Ministry. A total of 22 training sessions were conducted at Head Office, Queen's Park and all Regional Offices. These instruction sessions were held in January, February, and March of 1979. Sessions were approximately 1 1/2 hours in length. The format of the session included a short video tape of Harold Gilbert, Deputy Minister, Ministry of Transportation and Communications speaking on the merits of teleconferencing; a presentation by communications staff; and a hands-on demonstration of equipment. Attendance at each session was purposely kept low (maximum 15 people) to ensure that everyone attending had ample opportunity to personally handle the equipment and have all questions answered. An actual teleconferencing call was arranged and conducted at each session.

The procedure for contacting participants differed slightly between Head Office and the Regions. At Head Office, a memorandum was directed to each Executive Director requesting that all interested staff attend a teleconferencing training session, the date and time scheduled by the project staff. For sessions conducted in the Regions, contact was first made through the Regional Director and the session was scheduled by the regional coordinator. It is estimated that 345 people attended the sessions.

4.2/ Sample

Everyone who attended a training session was requested to complete an evaluation-questionnaire. The findings presented herein are based on 273 questionnaires which were returned. This represents a 79.1% return rate. Of the returned questionnaires 96 or approximately 35% were from the Regions and 177 or 65% came from Head Office.

As to the 21% of the people who did not complete or return an evaluation-questionnaire, there is no evidence to suggest that these people would have represented any bias with their inclusion or exclusion from the sample.

4.3/ Findings

4.3.1/ Teleconferencing Potential

The most important component of the evaluation was to obtain a measure of potential use for teleconferencing and its substitutability for travel to meetings. Therefore, it was important at the outset to determine how many teleconferences could be made by those people who attended an instruction session both before and after the presentation. This would not only give a rough measure of the number of potential teleconferences but also provide a preliminary indication of the effectiveness of the presentation.

The instruction sessions were relatively successful in informing people about teleconferencing. Prior to the sessions people estimated that they potentially, could be involved in 133 teleconferences in one year. After attending the presentations, participants estimated they could potentially be involved in a total of 781 teleconferences. This represents a 487% increase in the total participation in teleconferences in one year. The breakdown for Regions and Head Office is shown in Table 1.

Table 2 shows the distribution of potentially teleconferenceable meetings. As shown in the table, 33% of the session attendees felt they could be involved in between 1 and 5 teleconferences in a year with an additional 15% indicating 6 to 10 teleconferences. Approximately 14% of the attendees felt they would not be involved in a teleconference and 33% did not make an estimate. It should be reiterated that this is only a rough indication of the number of teleconferences possible. Attendees may in fact be part of the same teleconference.

Asked the likelihood of using teleconferencing within a three month period starting from the date of the presentation which they attended, 31.8% said they would either definitely, or very likely be involved in a teleconference within that time period. (See Table 3). As shown in the table, 41% felt it was not very likely that they would be involved in a teleconference within the next three months and about 3% were sure they would not. Reasons for these responses are given in Table 4. About 40% of the respondents who gave reasons for their likelihood of involvement or non-involvement said they would not participate in teleconferencing because it was inapplicable to their position. However, over 18% said they would definitely use it for some meetings; 14.2% said their use was dependent on the situation or circumstances; and 10.3% said they would at least attempt a teleconference. An important observation which can be made from the table is that almost 30% of the responses reflected either definite use or intention to use teleconferencing.

Several teleconferencing methods were explained and demonstrated at the presentations; however, the focus was on the Dedicated Network. Therefore, it is not surprising that this method was the one respondents felt they were most likely to use. In total, 43.5% of the respondents felt they would use the Dedicated Network. As shown in Table 5, 36.3% felt they were likely to use a Speakerphone and 23.1% felt they would use the Conference 2000. It should be pointed out that Speakerphones were only demonstrated in the regions even though there are some Speakerphones at Head Office, and the Conference 2000 was only demonstrated at Head Office. A relatively high proportion of people (23.8%) could not say which teleconferencing system they were likely to use and only 4.4% stated they would not use any system.

One of the underlying purposes for teleconferencing is its substitutability for travel to meetings. The people who attended the sessions estimated that they collectively travelled to 2539

meetings. After attending the instruction sessions they felt a total of 561 meetings or 22%, could have been substituted for by teleconferencing. As shown in Table 6, it was estimated that 16.1% of meetings travelled to by regional personnel could have been substituted by teleconferencing and 28.4% of the meetings travelled to by head office personnel could be replaced by teleconferencing.

4.3.2/ The Presentation

Most respondents felt the teleconferencing training session presentation increased their awareness and knowledge of teleconferencing. Ninety-seven percent of the participants expressed this view. Of the 10% that commented on this aspect, awareness and knowledge increased because the participants had either no prior knowledge of teleconferencing or because they now had a greater appreciation of the scope of teleconferencing and more confidence in equipment use.

The presentation was apparently successful in instructing people how to operate the teleconferencing equipment. Ninety-six percent of the participants felt that with the information presented to them, they had acquired enough knowledge about teleconferencing to actually conduct a teleconference. As can be seen in Table 7, participants had a high opinion of the seminar. Almost 94% felt the presentation was either excellent or good and no one (0%) rated the presentation unsatisfactory.

Survey participants were asked to comment on any aspects of the presentation, particularly on any factors they felt could be improved. Twenty-two percent of those who attended a session commented on the presentation. The results are presented in Table 8. As can be seen from the table, of the small number of people who commented on the presentation several suggested changes to improve the content and format of the presentation (42.6%). Having more time to handle the equipment and improving the delivery of the presenters were mentioned less frequently (13.1% and 11.5% respectively). About 25% of those respondents who commented on the presentation stated it was a good presentation and suggested no change be made to it.

5/ SURVEY OF USERS AND POTENTIAL USERS

5.1/ Introduction

In order to obtain a better understanding and gauge the reaction of people towards audio teleconferencing a questionnaire survey was undertaken at MTC. The survey took two forms. The major component of the survey was a self-completion questionnaire directed at:

1/ known users of teleconferencing identified through usage forms;
2/ individuals who attended a training session and indicated they would use teleconferencing but who had not used teleconferencing to date; and
3/ selected directors and program managers at Head Office who were considered to be candidates for teleconferencing but who had not used teleconferencing or indicated potential use.

A secondary component of this survey was a discussion of teleconferencing with several individuals who were both originators of teleconferences and major users. These individuals included an Assistant Deputy Minister, several Regional Directors, program coordinators and managers. These discussions took the form of interviews conducted either in person or by teleconferencing. In total, eleven interviews were conducted.

5.2/ Questionnaire Design and Distribution

The questionnaire used in this survey was distributed to selected participants on July 4, 1980 and was to be returned for analysis by August 1, 1980. This lead time afforded participants time to complete the questionnaire at their leisure and provided an opportunity for individuals on vacation to return and respond. A copy of the questionnaire is included in the appendix. The questionnaire was accompanied by an introductory letter by John R. Barr, Assistant Deputy Minister for Finance and Administration, which briefly outlined the objectives of the survey. In order to ensure a high response rate a follow-up contact was made either by mail, in person, or by telephone. This follow-up contact was coordinated in the Regions by the regional coordinators.

The questionnaire was divided into two sections. The first section was designed to obtain some indication of the knowledge, awareness and potential use of teleconferencing. The second section was designed primarily to determine the extent of usage and level of satisfaction with teleconferencing.

5.3/ Sample

The questionnaire was distributed to 435 people, 231 at Head Office and 204 in the Regions. As shown in Table 9, 368 questionnaires or approximately 85% were returned. A total of 200 questionnaires were returned from Head Office representing an 86.6% return rate. From the Regions, 168 questionnaires were returned representing an 82.4% return rate. Head Office questionnaires constitute 54.3% of the total sample whereas Regional questionnaires constitute 45.7% of the total. Detailed breakdown by individual region is given in the table.

Table 10 gives a relative indication of the classification or title of individuals participating in the survey. As inferred from the table, approximately 65% of participants are classified at least as a supervisor or head while 35% have less senior classifications.

5.4/ Findings

In order to put the subsequent analysis in perspective, it is important at the outset to briefly indicate the relative proportion of users to non-users of teleconferencing. This is given in Table 16. As shown in the table, 75.8% of the people participating in the survey have used teleconferencing whereas 24.2% have not. User/non-user comparisons of certain variables will be made where relevant.

5.4.1/ Knowledge and Awareness

One objective of this survey was to determine participant knowledge and awareness of teleconferencing. One measure of knowledge was to determine whether people could actually arrange a teleconference utilizing various teleconferencing equipment. To

this end a subjective assessment was made by survey participants. These results are presented in Tables 11 through Table 13.

(1) Dedicated Network

Slightly more than 56% of the sample felt they had sufficient knowledge to arrange a teleconference utilizing the Dedicated Network, of which 12.8% felt they would have no problem whatsoever. Approximately 44% felt they did not have sufficient knowledge to arrange a teleconference via the Dedicated Network, 28.8% of which said they definitely could not. The differences between Regions and Head Office are small and not statistically significant.

(2) Speakerphone/Conference 2000

Thirty-four percent of the sample felt they had sufficient knowledge to arrange a teleconference using either a Speakerphone or Conference 2000. Specifically, 12.8% felt they would have no difficulty at all. Sixty-six percent of the sample felt they did not have enough knowledge to arrange a teleconference using either of these equipment and 28.8% said they definitely could not. It should be reiterated that Speakerphones are available at Head Office and in the Regions, whereas the Conference 2000 unit is located at Head Office. For this reason Regional-Head Office comparisons between methods are difficult to make. However, it is noteworthy that 37% of the participants in Head Office felt they could make the necessary arrangements and only 30.4% of those in the Regions felt they had sufficient knowledge with at least some instruction.

(3) Standard Desk Phone

Forty percent of the total sample felt they had enough knowledge to arrange a teleconference over the regular telephone network utilizing the standard desk phone. In fact 23.6% felt they would have no problem. Sixty percent of the sample felt they could not arrange such a teleconference without more information. Slightly more than 26% felt they definitely could not. The differences between Regional participants and Head Office participants are not significant.

Generally, non-users have a lower knowledge or awareness of various teleconferencing equipment. Table 14 gives an indication specifically of the knowledge of teleconferencing equipment of non-users. Comparatively, 76.3% felt they could not arrange a teleconference using the Dedicated Network, 67.4% felt they could not arrange a teleconference using either a Speakerphone or Conference 2000, and 59.6% felt they could not arrange a teleconference using a standard desk phone.

Another measure of awareness was determining where within MTC survey participants would go to either arrange a teleconference or obtain information on teleconferencing. As shown in Table 15, 35% of the survey participants at Head Office said they would contact the Special Services Office and a further 23.5% specifically said they would contact Terry Parr of Special Services who is the head office coordinator. Twenty-nine people (14.5%) did not know who they would contact for information. In the regions, the majority of people stated they would contact their regional coordinator. Slightly more than three-quarters (75.6%) of the regional people surveyed said they would contact their regional coordinator. About 15% did not know whom they would contact. Besides local coordinators, head office coordinator or Special Services, other information sources mentioned included the Communications Division, office secretaries, the conference operator, and known users. Non-users represent slightly more than half of all the people who said they did not know how to arrange a teleconference or obtain information about teleconferencing. About 30% of the non-users said they would contact their local coordinator and approximatley 21% said they would contact the Special Services Office.

Another aspect concerning knowledge, awareness or interest in teleconferencing is whether or not participants would like to be contacted by someone who would provide them with more information on teleconferencing. As shown in Table 16, slightly more than 21% of the total sample were interested in obtaining more information on teleconferencing. Further, it is noteworthy that users are "equally" interested in obtaining teleconferencing information as are non-users.

5.4.2/ Potential Use

Similar to the approach used in evaluating the training sessions, an attempt was made to determine the potential for teleconferencing. In order to do this it was important to establish some characteristics of meetings, specifically the number meetings where travel is involved for any of the participants. These findings are summarized in Table 17. Table 18 gives an indication of the total number of meetings that could be substituted for by teleconferencing. Survey participants estimated they collectively attend a total of 1999 meetings in a year between head office and regions where travel is required for someone attending the meetings. It was felt that 563 meetings or 28.2% could be substituted for by teleconferencing. Proportionately, the greatest potential for substitution is for Region to Region meetings (38.3%), and the lowest potential is for meetings at other locations (1.8%) and Regional to District meetings (1.8%). It should be pointed out that this is only a gross measure of the total number of potential teleconferences. Most people surveyed would be involved in meetings with other people who were also surveyed subsequently duplicating responses. These figures should be interpreted with caution as they only give a crude indication of potential.

Table 19 gives an indication of the expected participation in teleconferences within the next year. It is estimated that survey participants would collectively be involved in a total of 1026 teleconferences. Table 19 also shows the distribution of participants with respect to the number of teleconferences they will be involved in. It is noteworthy that 102 people of which 55 people are non-users estimate that they will not be involved in any teleconferences, and 36 people did not know how many teleconferences they will be involved in. Fifty-seven people felt they would be involved in more than five teleconferences.

5.4.3/ Reasons for Non-Usage/Ways to Encourage Use

As indicated previously, there were 89 non-users who represent 24.2% of the total sample. It is important to establish reasons why these people have not made use of teleconferencing since they were identified as potential users based on findings presented in the training session evaluation or their relative position in the organization. These reasons are given in Table 20. As shown in the table, approximately 60% of the non-users have had no occasion to use teleconferencing and a further 12.4% are involved in meetings in places where there is no system. Other reasons were mentioned less frequently.

It is also important at this point to determine what could be done to encourage use of teleconferencing for both users and non-users. These findings are presen ed in Table 21. As shown in the table, 22.3% of the survey participants felt they would use teleconferencing more if they had more information or detailed instruction. A further 21.5% felt they would use it more if they had a greater need and 16.6% said greater accessibility of equipment would prompt greater use. Other reasons were mentioned less frequently. However, it is important to note that 28 people (7.6%) would teleconference more if the transmission quality was improved.

5.4.4/ Reported Systems Usage

In order to obtain some indication of the nature of teleconferencing experience, users were asked to provide information on usage of various teleconferencing systems since February 1979 to the date of the survey. The results are presented in Table 22. It should be pointed out at the outset that the results presented should be interpreted with caution as a result of the limitations of the original sample design. One component of the sample was based on known users of teleconferencing. The major source of information was provided by Dedicated Network usage as information as to Speakerphone and Conference 2000 users was limited, and information on users of the standard desk phone unavailable. Therefore, the source of the information should be considered when interpreting and making comparisons of systems usage.

(1) Dedicated Network

In total, 253 people or 90.7% of the total users had used the Dedicated Network. Dedicated Network teleconferences had a total participation of 698 people. As was previously discussed, this is only an indication of participation and not an actual number of teleconferences, some of these conferences may in fact be the same teleconference. At Head Office, 88.3% of the users had used the Dedicated Network accounting for a total participation of 346 people. In Regions, 93% of the users had used the Dedicated Network accounting for a total attendance of 352 people.

(2) Speakerphone/Conference 2000

Slightly more than 22% of users had used either a Speakerphone or Conference 2000. These users accounted for a total participation of 320 people in teleconferences of this nature. At Head Office, 17.5% of the users, (accounting for participation of 151 people) had used either the Conference 2000 or Speakerphones. Based on empirical results, it was observed that at Head Office Conference 2000 participation predominates over Speakerphone participation. In regions where Speakerphone participation predominates, 26.8% of the users have used Speakerphones and collectively they accounted for a total participation of 169 people.

(3) Standard Desk Phone

People use the standard desk phone for making teleconferences more infrequently than any other method. Only 14.3% of users had used their standard desk phone for the purpose of making a conference call. A total participation of 161 people were involved. At Head Office 17.5% of users (total participation 101 people) and in the Regions 11.3% (total participation 60 people) had used their phones in teleconferencing a meeting.

5.4.5/ User Reactions: Advantages and Disadvantages of Teleconferencing

A subjective assessment of teleconferencing was obtained by asking users what they felt the advantages and disadvantages of teleconferencing were. As shown in table 23, more than three-quarters (77.4%) of the users felt eliminating travel for some participants was an advantage of teleconferencing. More than half of the users (50.5%) said the meetings took less time and 37.6% flet having the opportunity to have more staff attending meetings were distinct advantages of teleconferencing. Reaching a decision or consensus more quickly was mentioned by 31.2% of all users. Other advantages were mentioned less frequently.

Losing face-to-face contact and non-verbal communication was considered by 22.6% of users to be a major disadvantage of teleconferencing. As shown in Table 24 slightly more than 12% felt teleconferencing was not suitable for all meeting types and 10% said more meetings were required to complete business. Meetings being more stressful or tiresome and the fact that they require more preparation were both felt to be a disadvantage by 9.3% of users. Other disadvantages were mentioned less frequently. No attempt was made to rank the most important advantage or disadvantage.

Determining which features of teleconferencing are worthy of highlighting for the purposes of promotion or encouraging use is also a subjective, qualitative assessment of the relative advantages of teleconferencing. This assessment is summarized in Table 25. Thirty-three percent of all users commented that teleconferenced meetings were better controlled, organized and efficient as a result of more direct discussion and less superfluous chatter. Slightly more than 12% of users stated they would highlight teleconferencing's convenience and ease of operation, and a further 8.2% mentioned that more meetings were now possible than before, thus enabling better coordination. Savings in time and cost (7.5%), having more staff able to attend meetings (6.5%) and less travel (2.2%) were other features users felt should be used in highlighting their experience with teleconferencing.

5.4.6/ Impact of Teleconferencing

In this survey an attempt was made to determine what impact teleconferencing had on the operations, or organizational efficiency of users. These findings are presented in Table 26. In general, of the users who commented on this aspect, most felt (24.4% of the total users) teleconferencing has caused no change or had no impact on their operations. A further 19.4% felt the impact was minimal (never negative) and 14.7% said they had not used teleconferencing enough in order to effect any change. However, 7.5% of users said savings in time and cost were results of teleconferencing. More efficient information exchange (6.5%), more efficient use of personal time (6.1%), the availability to readily teleconference (4.7%), fuller staff representation at meetings (2.5%), more efficient planning of meetings (0.4%) and the skill of better probing (0.4%) were also mentioned as impacts on operations or organizational efficiency.

5.4.7/ Satisfaction With Teleconferencing

Over 96% of users expressed satisfaction with teleconferencing as a means of communication. As shown in Table 27, 6.8% were completely satisfied and 43.0% were very satisfied. While ten people expressed dissatisfaction, no one was completely dissatisfied. Most people were satisfied acknowledging that audio teleconferencing has certain limitations and cannot take the place of all meetings. However, some people felt that considering the time saved and efficiency at which business is conducted, teleconferencing is an effective management tool.

Approximately 90% of the users expressed satisfaction with the equipment and transmission with 6.8% being completely satisfied and 45.5% being very satisfied. About 11% of the users expressed some dissatisfaction although as seen in Table 28 no one was completely dissatisfied. The major complaint, mentioned by 37 users was system failures or drop offs. An additional 30 users remarked on technical or transmission problems, in particular poor reception, low volume or feedback.

5.4.8/ Summary of Interviews With Teleconference Originators and Major Users

Eleven personal interviews were conducted with selected teleconference originators and major users. The criteria for inclusion into this sample was that originators must have originated at least three teleconferences and major users must have used teleconferencing a minimum of 15 times. Those interviewed included an assistant Deputy Minister, several Regional Directors, program coordinators and managers. Their comments are summarized below.

In general, the comments of teleconference originators and major users support and complement the findings of the major survey. All people interviewed not only liked teleconferencing, specifically the Dedicated Network, but would not like to have it removed as a service. Most of those interviewed had some prior knowledge of teleconfencing and this helped prompt usage. Lorne Eadie, Assistant Deputy Minister Provincial Highways, ventured into teleconferencing because he saw it as a means of saving time for his regional staff where a half day meeting would often require two days of employee time. Saving the wear and tear on individuals as a result of travel was also an important consideration, as well as the fact that teleconferencing enabled Regions to readily call upon their local resources (staff and documentation) in a discussion. These sentiments were also echoed by others who were interviewed. Regional Directors felt they were able to work more normal hours and be more productive. Reducing travel time allowed them the opportunity to stay at their respective Regions and handle all problems as they arose, no longer having to return home after exhaustive travel to a desk full of work which had accumulated in their absence. It was expressed that teleconferencing improved the coordination between Head Office and the Regions by allowing for simultaneous dissemination of information and fuller regional representation at meetings.

It was recognized that teleconferencing although useful, has certain limitations. It requires more pre-planning than face-to-face meetings and it is not conducive to presentations, especially presentations where immediate back and forth exchange of information is required. However, teleconferencing was considered suitable as a replacement for most face-to-face meetings and its advantages far outweigh any disadvantages. Some of these advantages are that meetings are better planned, more structured and business-like, and as a result are generally completed in less time. Greater concentration on issues and less side track discussion are also positive features of teleconferences. As chairpersons, those interviewed felt they had better control of the discussion and speakers, and were themselves better prepared and organized.

Equipment and transmission problems were considered to be the only major negative factor about teleconferencing. These faults were considered too frequent and as a result very frustrating. In specific cases mentioned, there were times when a region could not be connected, regions were inexplicably cut off, or there was a ringing on the lines. It was still felt that after 18 months experience with the Dedicated Network more fine tuning of equipment was required. It was also suggested that some type of device be hooked up to the system to let everyone else know when someone has been dropped off. It was also suggested that Bell Canada phone lines should be available in boardrooms where the Dedicated Network is used in order to immediately contact any location experiencing difficulties. Improving the quality of Bell Canada's transmission and having Speakerphone/Conference 2000 operating instructions displayed more prominently were also suggested by those interviewed.

6/ USAGE OF TELECONFERENCING

6.1/ Introduction

The inauguration of Audio Teleconferencing within MTC took place on February 14, 1979. This section intended primarily to describe systems usage in the 18 month period since that time. This section incorporates the findings obtained from usage forms and other information sources such as booking forms and charge records. It is important to stress that several assumptions were made in order to make estimates of cost and fuel savings. The figures quoted should only be regarded as gross estimates since travel and transmission costs are variable and are subject to change without notice. The figures presented are based on assumptions and estimates which were made in February 1979. These assumptions and estimates are outlined in the appendix.

6.2/ Findings

As of 1980-08-31 there were 384 known users of audio teleconferencing. Most users had participated in only one teleconference. As shown in table 29, 190 people (49.5%) had participated in one teleconference. A further 23.2% had participated in two teleconferences and interestingly, approximately 10% were frequent users having participated in over five teleconferences during the 18 month experimental period.

It is important at this point to relate teleconferencing usage back to findings presented in the training session section in order to derive some measure of the relative impact of the training sessions. This impact is not a measure of the usefulness of the training session, rather its attempt to reach potential users. Of the 384 known users, 93 (24.2%) had previously attended a training session. About 34% of the training session attendees were users of teleconferencing. As shown in Figure 1, 68% of this proportion had perceived use whereas 32% had not perceived use. Of the 177 training session attendees who had not teleconferenced to date, about 54% did not perceive use whereas 46% did perceive use. Based on these findings some potential still exists for future participation of training session attendees in teleconferences.

6.2.1/ Dedicated Network

Table 30 is a detailed breakdown of the actual observed usage and costs of the Dedicated Network as well as the expected costs which would have been incurred had teleconferencing not been available and travel to meetings been required. The derivation of the travel cost includes only those teleconferences which substituted for travel and excludes those individuals identified on the usage forms as non-essential or observers to the meeting.

Since February 14, 1979, the Dedicated Network has been used 86 times for a total use time of 182 hours and 20 minutes. It was determined that 88% of the teleconferences substituted for travel to meetings. The estimated total accumulated on-line cost (toll charges) for the 86 calls was $7 630. As shown in Table 30, it is estimated that audio teleconferencing with the Dedicated Network has resulted in a total travel cost-savings of $93 735. This travel cost-savings includes estimates of transportation costs, acommodation costs, and a dollar estimate of the total employee time indirectly saved as a result of avoiding travel. One of the underlying objectives of teleconferencing was to help reduce overall fuel consumption. It is estimated that usage of the Dedicated Network in its first 18 months of operation has resulted in fuel savings of 42 098 L. As shown in Table 30, based on the 86 Dedicated Network teleconferences, the average teleconference would last approximately 2 hours and 12 minutes and have a toll cost of $89. The average teleconference would result in total travel savings of $1 090 (excluding rental charges); and result in fuel savings of 490 L. Table 30 also indicates averages per teleconferences that substituted for travel. On average, the teleconferences substituting for travel generally last longer and have greater savings than teleconferences which do not substitute for travel.

As shown in Table 30, teleconferencing can result in substantial savings in both travel dollars and travel time. This is more clearly shown in Table 31. It is conservatively estimated that teleconferencing resulted in a net savings of about 23% when comparing teleconferencing charges and estimated travel savings

- not incorporating estimates of employee travel time. When estimates of time lost through travel are included, a savings of approximately 54% are realized. These savings take into account the expense of equipment purchase, rental, amortization and toll charges.

Figure 2 shows the relative distribution of Dedicated Network teleconferences over the 18 month study period. As seen in the figure, there appears to be a definite seasonal variation in system usage. In general, the system is used less frequently in the summer and warmer months than in the winter and colder months. Some explanations for this pattern are that more people on holidays in the summer (potentially fewer meetings overall) and there is also less resistance to travel. Winter conditions make travel more inconvenient and teleconferencing more appealing.

Some other characteristics of Dedicated Network teleconferences are presented in Table 32. A major proporation of the teleconferences (60.4%) involve 5 or 6 locations. Specifically, 33.7% are five location calls and 26.7% are six location calls. In most instances teleconferencing substituted for travel. Only ten meetings took place where teleconferencing did not substitute for travel. Most of these, (90) were two-location teleconferences. It is estimated that 1 016 people have used the Dedicated Network.

As shown in the table, 461 trips were saved as a result of teleconferencing resulting in travel time and cost savings as well as fuel savings.

The range of meeting types has been broad with the Dedicated Network. They have included meetings which involved problem solving, information exchange, work discussions, briefings and coordination of related activities. As shown in Table 33, the major users of the Dedicated Network were the Operations Committee and Subcommittees (36.0%), Engineering Committees (23.3%),

and Personnel Committees (14.0%) which includes Management Employee Group (M.E.G.) and Affirmative Action meetings. The majority of these meetings are regularly scheduled and most participants know each other well. Impromptu meetings are less frequent but also occur.

6.2.2/ Speakerphone - Conference 2000

The findings below are based on information derived from 24 Speakerphone teleconferences and 14 Conference 2000 teleconferences. The findings must be interpreted with caution due to the relatively small and perhaps unrepresentative sample size. There is evidence to suggest that usage of these methods is greatly underestimated. Due to difficulties in monitoring the use of Speakerphones and the Conference 2000, comparatively little is known with regard to their usage and cost savings. Both types of teleconferencing methods can be used over tie lines and the regular long distance network. As a result, there is either no charge or long distance charges; and it is difficult to retrieve this information. However, some superficial findings and observations can be made.

On average, Speakerphone teleconferences are shorter in duration thatn Dedicated Network teleconferences, with 88% being less than one hour in length. The average duration was observed to be 20 minutes. Most Speakerphone teleconferences involve two locations (75%) and the average attendance is 4 people per teleconference. Unlike the Dedicated Network, Speakerphone teleconferences seldom substitute for travel, as only 2 (8%) of the reported teleconferences substituted for travel. As shown in Table 34, the estimated travel savings attributed to Speakerphon teleconferences was $1 390. The total estimated fuel savings were 392 L.

Similar to Speakerphone usage, teleconferences using the Conference 2000 usually involve 2 locations (71%). The average duration time for the 14 teleconferences was 45 minutes and the average number of participants per teleconference was 5 people.

Approximately 43% of the teleconferences substituted for travel. As shown in table 35, the estimated travel savings as a result of Conference 2000 teleconferences was $2 856, with estimated fuel savings of 1 124 L.

6.2.3/ Standard Desk Phone/Regular Telephone Network

Very little is known about the actual usage of the standard desk phone. Monitoring usage of this type of teleconferencing is very difficult due to its vast range of locations. However, a search of the Bell Canada chargeable calls for the Ministry revealed that usage of the conference operator was light. From the period February 1979 to August 1980, only 6 calls using the conference operator were detected. This contradicts the findings presented in the survey where it was indicated that 161 people involved in teleconferences using the standard desk phone. An explanation for the discrepancy is that these were either teleconferences utilizing and add-on or that participants in the survey over estimated their usage of this teleconferencing method. Information on the charge records are incomplete as they do not indicate the number of locations or number of people participating. However, it was determined that for the six teleconferences length of call was 37 minutes and the average cost was $52.

7/ SUMMARY AND DISCUSSION

The training session, teleconferencing survey and information on systems usage provide sufficient information from which an assessment of the audio teleconferencing program can be made.

7.1/ Training Sessions

The training sessions conducted at the Ministry can be considered relatively successful. They were conceived of and organized as a means to inform and educate potential users of teleconferencing about various teleconferencing methods available to them. The sessions were a good way to inform a large number of people about teleconferencing in a quick and efficient manner. It was also a good means of giving the program some visibility within the Ministry for promotional purposes by letting people know that the program does exist and who to contact for more information. The approach used in these training sessions was seen to be the best method not only for presenting information but allowing for equipment demonstration and use. It was this human-machine interaction which allowed potential users the opportunity to overcome their initial inhibitions regarding equipment usage. A suggestion made by attendees to improve the sessions was to allocate even more time to this component.

The sessions can be considered relatively successful because they did increase awareness, as indicated in the substantial increase in potential number of calls. Furthermore, 35% of those people attending a session had used teleconferencing. It should be pointed out that although the majority of attendees (65%) had not used teleconferencing, the main reason for this can be explained by the nature of the audience. A number of people attended the sessions for informational purposes only, as the nature of their job requirements would never require usage of audio teleconferencing. It is desirable to develop a strategy which is more effective in reaching the potential user.

However, based on study findings it was determined that audience selection should not be restrictive. Study findings revealed that many people who did not perceive use had in fact been involved in a teleconference. Users also represent a wide range of job classifications.

From MTC experience, several suggestions can be made with regard to future training sessions both within the Ministry and outside the Ministry. Presentations should be made to selective audiences where attendence is limited in number. The primary reasons for this are to ensure that everyone attending is a prospective user and each individual has an ample opportunity to personally handle the equipment and have all of their queries answered. The presentation should be kept relatively short with the major component of the presention being a user-equipment interaction. Hands-on demonstration is a key to getting the potential user comfortable with the equipment. The general group demonstrations should be supplemented with selective group sessions i.e., identified potential high volume users as well as one on one instruction sessions with individual major users. Also, training sessions should be given periodically throughout the year and incorporated as part of the overall Ministry orientation for new personnel. These suggestions as well as effective promotion through use of periodic memoranda, posters, telephone directory information, pamphlets, and articles in MTC News, are ways of maintaining the program profile.

7.2/ Survey of Users and Potential Users

Teleconferencing has been a positive introduction in the Ministry. No one who was interviewed or surveyed felt it should be removed as a service. Several observations can be drawn from the survey findings. Most users of teleconferencing are first or second time users with only 10% of the known users using teleconferencing over five times in the 18 month study period. Usage was not confined to upper level management although major users were identified as being very senior personnel. The fact

that middle and lower management are also using teleconferencing is encouraging and will be useful in maintaining operational continuity when staff disruptions through retirement or re-assignment are experienced.

There is generally a high awareness of who to contact or where to go for further information on teleconferencing. This was particularly evident in the regions. This would tend to re-emphasize the merits of having informed and involved, head office and regional coordinators. The coordinators are important personnel in the overall program with respect to their role and responsibility in equipment set-up, monitoring, and their liaison capacities both within the regions and with Head Office.

The survey indicated that there is still further potential for increasing the number of teleconferences. It was expressed that greater needs would result in increased usage. Increasing needs are difficult to achieve and it should be pointed out that participation in teleconferencing is voluntary; however, it was also felt that providing more information or detailed instruction would encourage further usage. One way this could be done is by having additional training sessions. Other ways of encouraging use include greater accessiblity of equipment (Speakerphone, Conference 2000 - more of them, in more locations) and improvements in transmission quality. This could be partially accomplished by ensuring that all conference rooms are acoustically treated and by having some equipment modifications such as volume controls. The fact that slightly more than 20% of the people surveyed were interested in obtaining information on teleconferencing or supplementing their present knowledge is an indication that people are becoming increasingly more aware of teleconferencing and this awareness may eventually result in increased usage. Further, it is interesting that at this point in time future increases in the price of transportation energy is not a factor which would contribute to increased teleconferencing usage unless it resulted in travel restrictions.

Some of the major advantages of teleconferencing as identified by users included eliminating travel for some of the participants (77.4%), shorter meetings (50.5%), more staff at meetings (37.6%) and reaching a decision or consensus more quickly (31.2%). However, when asked to describe features of teleconferencing they would highlight in promoting usage, users commented that teleconferencing meetings are better controlled and organized than face-to-face meetings and subsequently more efficient as a result of more direct discussion. Convenience, ease of operation and improved coordination were also factors mentioned in favour of teleconferencing. The major disadvantages of teleconferencing relative to face-to-face meetings as expressed by users were the loss of face-to-face contact and non-verbal communication with conference participants. The unsuitability of teleconferencing for all meeting types was also considered a disadvantage. Further, 10% of the people felt more meetings were required to complete business.

While teleconferencing was considered by users to be a positive innovation, most users felt the introduction of teleconferencing has made little direct impact on their operations of organizational efficiency. Basically, this is a result of infrequent usage. However, whatever impact there has been gen- erally been light. What has been expressed is that the advantages of teleconferencing are in improved communications and time savings. Time savings are expressed as savings incurred as a result of not travelling; time not spent away from their desks - no backlog of work; and less time actually spent in the meeting. It was also expressed that some managers felt they were more effective at teleconferencing meetings because they had their resources at hand, and also more productive overall as a result of increased availability to handle all problems as they arise.

Teleconferencing users are satsified with audio teleconferencing as a means of communication, fully realizing that it is not suitable for certain types of meetings. Users are generally satisfied with the equipment and transmission and have very few complaints about teleconferencing within the Ministry.

The survey further supported the major findings of several previous social evaluations of audio teleconferencing.* Teleconferencing works best in situations where participants know each other. Most teleconferences at MTC are familiar with each other. It is perceived to be effective for crisis decision making when a face-to-face meeting is not possible. Teleconferenced meetings are generally shorter and more orderly (more businesslike) relative to face-to-face meetings. Further, participants in a teleconference felt they were more attentive to what was being said in an audio teleconference than a face-to face meeting. The survey findings supported only in part, previous studies identifying some weaknesses of audio teleconferencing. Other findings concerning weaknesses were disproved. While audio teleconferencing is generally viewed as being less personal, at MTC it was not seen as creating an uncooperative communications environment.

MTC survey results disprove prior findings indicating that participants perceive a less relaxed or intimate environment relative to face-to-face meetings. There was no evidence supporting the "us" to "them" tendencies which have developed in other examples of audio teleconferencing. On the contrary, it was implied in several cases that the relationship between Head Office and Regions had in fact improved as a result of teleconferencing. Survey findings supported the fact that a major weakness of teleconferencing was the absence of verbal clues to indicate the reaction of participants. The findings also supported the view that audio teleconferencing often resulted in less indepth discussion, could be more tiring on the individual, and required more chairperson control. However, it should be pointed out that requiring more chairperson control was not seen as an impediment or disadvantage, in fact in many cases it was considered an advantage. Audio teleconferencing in the Ministry, in contrast

* Comparisons were made with observations presented in a report by Robert Johansen, Social Evaluation of Teleconferencing, which was printed in Telecommunications Policy, December 1977.

to previous social evaluations of teleconferencing was not considered by participants to be less productive than face-to-face meetings.

7.3/ Systems Usage

The excellent monitoring procedure of the Dedicated Network has provided detailed information from which to make some comments with regard to system usage. Unfortunately, relatively little is known about the other teleconferencing methods and more information is required before a thorough assessment can be made. For this reason it is important to maintain a detailed monitoring program. However some preliminary observations can be made. Teleconferencing has resulted in savings in time, money and fuel. The program has been economically worthwhile. The dollar and fuel savings to be gained from travel avoidance through voluntary audio teleconferencing are not enormous but are sufficient to offset the costs of many audio teleconferencing systems. The improvements in communication can be considered as an added plus.

The Dedicated Network can be considered a means to substitute travel with communications. On the other hand, usage of the Speakerphones, Conference 2000, and standard desk phone were generally used not for substituting travel but to enhance communications. Dedicated Network teleconferences are typically longer, involve more locations and more people than Speakerphone, Conference 2000 or standard desk phone teleconferences. The three other teleconferencing modes, however, allow for a wider range of teleconferencing locations, other than those specified in the Dedicated Network. It would appear that each method of teleconferencing has its particular advantages and applications, and all of them seem to complement each other.

Audio teleconferencing cannot replace all face-to-face meetings but it can reduce their frequency and expense. The benefits of teleconferencing can be expressed in monetary, managerial and social terms. Audio teleconferencing is one of the most efficient and effective ways to improve coordination in a decentralized organization without the cost of travel and the loss of

teleconferencing can be expressed in monetary, managerial and social terms. Audio teleconferencing is one of the most efficient and effective ways to improve coordination in a decentralized organization without the cost of travel and the loss of valuable time on the job. It provides a readily accessible group communications network. It allows more frequent consultation for information exchange and discussion and wider participation of personnel who would not normally travel, particularyly local "experts" whose participation may be required on only one agenda item. Teleconferencing increases efficiency by saving time. Time is saved in the meeting, travelling to meetings, and by not allowing work to accumulate in absence. It also keeps key people on the job. Teleconferencing streamlines decision making as meetings are generally more organized and require less time. It also allows immediate consultation in emergencies. By replacing travel, teleconferencing reduces associated transportation costs and oil based energy consumption.

There are four areas to consider before making specific recommendations. These areas concern teleconferencing equipment and services, systems monitoring, awareness and promotional programs, and review of expansion of audio teleconferencing within MTC. A general overview of these areas is presented below:

Audio Teleconferencing Equipment and Services

- The equipment has demonstrated to be fairly reliable.
- There is a high level of satisfaction with the equipment and service, especially among senior Ministry personnel.
- The various teleconferencing methods complement each other.
- It is economically worthwhile; there has been a good return on investment as overall savings exceed costs, and the margin of savings is expected to increase even more in the future.
- The Audio Teleconferencing program has been received favourably and there are several specific social and economic benefits.

Systems Monitoring

- Not enough reliable information has been obtained on Speakerphone, Conference 2000 and desk phone teleconferencing usage; improved records maintenance should be established and kept in order to provide data for additional study.
- Not enough is known about the long term effects of system usage; usage may decline at a later time, at which point requiring a stimulus to increase usage.

Awareness and Promotion

- Required in order to maintain program integrity and current level of usage.
- Required to increase teleconferencing utilization among existing users and secure the latent market.
- Inform new personnel of the Audio Teleconferencing program.

Expansion Within MTC

- Expansion of existing equipment to districts if requested and if justified.
- Monitor technological developments within the industry in order to upgrade equipment/services.

8/ RECOMMENDATIONS

Based on the first 18 months experience with audio teleconferencing at the Ministry and the findings presented in this report it is recommended that Audio Teleconferencing be installed as a regular, ongoing service under the following conditions:

1/ the existing equipment and services be retained;

2/ continuance of program monitoring with participation of Special Services Office be conducted for an additional period of one year;

3/ continuance of an awareness and promotional program; and

4/ examination and review of possible future expansion of audio teleconferencing facilities within MTC, the need and justification to be demonstrated to the Special Services Office.

Table 1/ Training Session: Before and After Presentation, Number of Teleconferences in One Year

	Number of Participants	Number of Conference Calls	Before Percentage	Number of Conference Calls	After Percentage	Percentage Increase
Regions	96	29	21.8%	208	26.6%	617%
Head Office	177	104	78.2%	573	73.4%	451%
Total	273	133	100.0%	781	100.0%	487%

Table 2/ Distribution of Potential Teleconferenceable Calls

Number of Calls	Number of People	Percentage
0	38	13.9%
1-5	90	33.0%
6-10	41	15.0%
11-15	11	4.0%
16-20	2	0.7%
20 +	1	0.4%
N.A.	90	33.0%
Total	273	100.0%

Table 3/ Likelihood of Using Teleconferencing Within the Next Three Month Period

	Number of People	Percentage
Definitely will use	26	9.5%
Very Likely	61	22.3%
Not Very Likely	112	41.0%
Definitely Not	7	2.6%
Can't Say/N.A.	67	24.6%
Total	273	100.0%

Table 4/ Reasons For Likelihood of Use or Non-use

	Number of People	Percentage*
Can't Foresee Using it/Inapplicable	82	40.2%
Definitely Will Use It For Some Meetings	38	18.6%
Depends on the Situation-Circumstances	29	14.2%
Intend To Try The System	21	10.3%
Some Meetings Can't Be Teleconferenced	11	5.4%
Meetings Held in Placed Not Hooked Up With The System	9	4.4%
Miscellaneous	14	6.9%
Total	204	100.0%

*based on percentage of total responses (204)

Table 5/ Teleconferencing Method Likely to be Used*

	Number of People	Percentage**
Dedicated Network	119	43.5%
Telephone Type - Speakerphone	99	36.3%
Conference 2000 (available only at Head Office)	63	23.1%
None	12	4.4%
Can't Say/N.A.	65	23.8%
Total	358	100.0%

*more than one answer was allowed
**based on number of times mentioned by sample size (273)

Table 6/ Substitutability for Travel

	# of meetings travelled to (yr)	# of trips substituted by telecon-ferencing	Percentage of meetings substituted
Regions	1302	210	16.1%
Head Office	1237	351	28.4%
Total	2539	561	22.1%

Table 7/ Opinion of the Presentation

Excellent	21.3%
Good	72.3%
Fair	6.4%
Unsatisfactory	0.0%

Table 8/ Comment on Presentation

	Number of People	Percentage*
Improve Format and Content (length, detail, explanation, presentation, demonstration)	26	42.6%
Good Presentation - No Change	15	24.6%
More Time to Handle Equipment	8	13.1%
Improve Speakers, Presenters	7	11.5%
Miscellaneous	5	8.2%
Total	61	100.0%

*based on percentage of total responses (61)

Table 9/ Survey: Sample Profile

Location of Respondent	Question-naires Distributed	Question-naires Returned	Return Rate	Percentage of Sample
Head Office	231	200	86.6%	54.3%
All Regions	204	168	82.4%	45.7%
-Central Region	40	34	85.0%	9.2%
-S.W. Region	41	32	78.0%	8.7%
-Eastern Region	43	38	88.4%	10.4%
-Northern Region	39	31	79.5%	8.4%
-N.W. Region	41	33	80.5%	9.0%
Total	435	368	84.6%	100.0%

Table 10/ Survey: Participant Classification*

Location of Respondent	Executive Director		Director		Manager		Coordinator/ Administrator		Head/ Supervisor		Other	
	#	%	#	%	#	%	#	%	#	%	#	%
Head Office	7	(3.5)	15	(7.5)	45	(22.5)	17	(8.5)	54	(27.0)	62	(31.0)
All Regions					38	(22.6)	7	(4.2)	55	(32.7)	68	(40.5)
-Central Region					9	(26.5)	3	(8.8)	12	(35.3)	10	(29.4)
-S.W. Region					7	(21.9)	1	(3.1)	10	(31.3)	14	(43.8)
-Eastern Region					6	(15.8)	1	(2.6)	9	(23.7)	22	(57.9)
-Northern Region					8	(25.8)	1	(3.2)	10	(32.3)	12	(38.7)
-N.W. Region					8	(24.2)	1	(3.0)	14	(42.4)	10	(30.3)
Total	7	(1.9)	15	(4.1)	83	(22.6)	24	(6.5)	109	(29.6)	130	(35.4)

* Percentages expressed as a percent of the respondent's location (row percentage)

Table 11/ Sufficient Knowledge to Arrange Conference Utilizing Dedicated Network*

Location of Respondent	Yes-No Problem		Yes-More Instruction		No-More Information		No-Not At All	
	#	%	#	%	#	%	#	%
Head Office	41	(20.5)	68	(34.0)	63	(31.5)	28	(14.0)
All Regions	30	(17.9)	68	(40.5)	49	(29.2)	21	(12.5)
-Central Region	4	(11.8)	12	(35.3)	11	(32.4)	7	(20.6)
-S.W. Region	6	(18.8)	16	(50.0)	7	(21.9)	3	(9.4)
-Eastern Region	6	(15.8)	16	(42.1)	14	(36.8)	2	(5.3)
-Northern Region	5	(16.1)	12	(38.7)	7	(22.6)	7	(22.6)
-N.W. Region	9	(27.3)	12	(36.4)	10	(30.3)	2	(6.1)
Total	71	(19.3)	136	(37.0)	112	(30.4)	49	(13.3)

* Percentages expressed as a percent of the respondent's location (row percentage)

Table 12/ Sufficient Knowledge to Arrange Conference Utilizing Speakerphone/Conference 2000*

Location of Respondent	Yes-No Problem		Yes-More Instruction		No-More Information		No-Not At All	
	#	%	#	%	#	%	#	%
Head Office	23	(11.5)	51	(25.5)	79	(39.5)	47	(23.5)
All Regions	24	(14.3)	27	(16.1)	58	(34.5)	59	(35.1)
-Central Region	-	-	5	(14.7)	12	(35.3)	17	(50.0)
-S.W. Region	9	(28.1)	7	(21.9)	4	(12.5)	12	(37.5)
-Eastern Region	3	(7.9)	4	(10.5)	22	(57.9)	9	(23.7)
-Northern Region	9	(29.0)	5	(16.1)	9	(29.0)	8	(25.8)
-N.W. Region	3	(9.1)	6	(18.2)	11	(33.3)	13	(39.4)
Total	47	(12.8)	78	(21.2)	137	(37.2)	106	(28.8)

*Percentages expressed as a percent of the respondent's location (row percentage)

Table 13/ Sufficient Knowledge to Arrange Conference Utilizing Standard Desk Phone*

Location	Yes-No Problem		Yes-More Instruction		No-More Information		No-Not At All	
	#	%	#	%	#	%	#	%
Head Office	47	(23.5)	41	(20.5)	68	(34.0)	44	(22.0)
All Regions	40	(23.8)	23	(13.7)	53	(31.5)	52	(31.0)
-Central Region	6	(17.6)	4	(11.8)	10	(29.4)	14	(41.2)
-S.W. Region	14	(43.8)	5	(15.6)	4	(12.5)	9	(28.1)
-Eastern Region	5	(13.2)	5	(13.2)	18	(47.4)	10	(26.3)
-Northern Region	11	(35.5)	2	(6.5)	11	(35.5)	7	(22.6)
-N.W. Region	4	(12.1)	7	(21.2)	10	(30.3)	12	(36.4)
Total	87	(23.6)	64	(17.4)	121	(32.9)	96	(26.1)

*Percentages expressed as a percent of the respondent's location (row percentage)

Table 14/ Non-Users Knowledge of Teleconferencing Equipment

	Dedicated Network		Speakerphone/ Conference 2000		Standard Desk Phone	
	#	%	#	%	#	%
Yes No-Problem	5	(5.6)	3	(3.4)	18	(20.2)
Yes-With Some Instruction	25	(28.1)	26	(29.2)	18	(20.2)
No-Require More Information	38	(42.7)	36	(40.4)	33	(37.1)
No-Not At All	21	(23.6)	24	(27.0)	20	(22.5)
Total	89	(100.0)	89	(100.0)	89	(100.0)

Table 15/ Arranging a Teleconference or Obtaining Information on Teleconferencing*

Location of Respondent	Local Coordinator		Head Office Coordinator		Special Services Office		Communi-cations Division		Secretary		Conference Operator		Known Users		Don't Know	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Head Office	39	(19.5)	47	(23.5)	70	(35.0)	17	(8.5)	11	(5.5)	4	(2.0)	5	(2.5)	29	(14.5)
All Regions	127	(75.6)	4	(2.4)	4	(2.4)	3	(1.8)	5	(93.0)	1	(0.6)	5	(3.0)	26	(15.5)
-Central Region	20	(58.8)	1	(2.9)	2	(5.9)	2	(5.9)	4	(11.8)	-	-	1	(2.9)	7	(20.6)
-S.W. Region	24	(75.0)	1	(3.1)	-	-	-	-	-	-	-	-	3	(9.4)	5	(15.6)
-Eastern Region	32	(84.2)	1	(2.6)	1	(2.6)	-	-	-	-	-	-	-	-	4	(10.5)
-Northern Region	23	(74.2)	1	(3.2)	1	(3.2)	1	(3.2)	-	-	-	-	1	(3.2)	5	(3.2)
-N.W. Region	28	(84.8)	-	-	-	-	-	-	1	(3.0)	1	(3.0)	-	-	5	(15.2)
Total	166	(45.1)	51	(13.9)	74	(20.1)	20	(5.4)	16	(4.3)	5	(1.4)	10	(2.7)	55	(14.9)
Non-Users	27	(30.3)	6	(6.7)	19	(21.3)	5	(5.6)	2	(2.2)	-	-	4	(4.5)	28	(31.5)

*Percentage expressed as a percent of the respondent's location (row percentage)
more than one answer was allowed

Table 16/ Would Like To Be Contacted By Someone With Information on Teleconferencing*

Location of Respondent	Yes		No	
	#	%	#	%
Head Office	40	(20.0)	160	(80.0)
All Regions	38	(22.6)	130	(77.4)
-Central Region	8	(23.5)	26	(76.5)
-S.W. Region	6	(18.8)	26	(81.3)
-Eastern Region	8	(21.1)	30	(78.9)
-Northern Region	9	(29.0)	22	(71.0)
-N.W. Region	7	(21.2)	26	(78.8)
Total	78	(21.2)	290	(78.8)

	Users		Non-Users	
	#	%	#	%
YES	58	(20.8)	20	(22.5)
NO	221	(79.2)	69	(77.5)
Total	279	(100.0)	89	(100.0)

* Percentage expressed as a percent of the respondent's location (row percentage)

Table 17/ Total Number of Meetings Where Travel Is Involved

Location of Respondent	Head Office to/from Regions	Head Office to Districts	Regions to Regions	Regions to Districts	Others
Head Office	772	183	-	-	974
All Regions	1227	-	141	815	318
-Central Region	232	-	48	143	133
-S.W. Region	150	-	21	136	74
-Eastern Region	165	-	47	298	44
-Northern Region	114	-	15	160	25
-N.W. Region	111	-	10	78	42
Total	1999	183	141	815	1292

Table 18/ Total Number of Meetings Which Could Be Substituted For By Teleconferencing

Location of Respondent	Head Office to/from Regions	Head Office to Districts	Regions to Regions	Regions to Districts	Others
Head Office	352	43	-	-	187
All Regions	211	-	54	95	44
-Central Region	47	-	19	21	4
-S.W. Region	52	-	11	11	6
-Eastern Region	51	-	15	34	9
-Northern Region	32	-	5	17	6
-N.W. Region	29	-	4	12	19
Total	563	43	54	95	231
% substituted	28.2%	23.5%	38.3%	11.7%	1.8%

Table 19/ Expected Participation in Teleconferences - Total Number in Next Year

Location of Respondent	Participation in Teleconferencing	Don't Know	Specific Number of Teleconferences						
			0	1	2	3	4	5	>5
Head Office	643	18	63	10	36	14	15	14	35
All Regions	383	18	39	14	24	18	20	8	22
-Central Region	65	5	10	4	2	4	5	1	3
-S.W. Region	85	2	0	2	6	4	3	3	5
-Eastern Region	98	4	11	3	5	3	3	3	8
-Northern Region	70	3	9	2	5	2	7	0	3
-N.W. Region	65	4	9	3	6	5	2	1	3
Total	1 026	36	102	24	60	32	35	22	57
Non-Users	64	8	55	5	13	3	3	1	1

Table 20/ Non-Usage of Teleconferencing

Number of Times Mentioned by Non-Users	Percent of Non-Users	Reasons
53	59.6%	Inapplicable, no need
11	12.4%	Meeting places do not have a system
4	4.5%	Need video
3	3.4%	Would have been involved but absent when office used system
1	1.1%	At Central Region, too close to Head Office

Table 21/ Encouraqe Use of Teleconferencing*

Number	Percent of Total Sample	Comments
82	22.3%	more information, detailed instruction
79	21.5%	qreater needs - usage is defined by needs - meetings are arranged by someone else
61	16.6%	qreater accessibility of equipment
30	8.2%	video
28	7.6%	higher transmission quality, volume control
12	3.2%	qreater equipment capabilities - data transmission
6	1.6%	more promotion, proding - data transmission
5	1.4%	meetinq suitability
3	0.8%	travel restrictions
3	0.8%	more experience, confidence
2	0.2%	time availability
1	0.1%	annual update, trainina
1	0.1%	better preparation
1	0.1%	ease for organizing members of prospective meeting

*more than one answer was allowed

Table 22/ Teleconferencing Usage Since Program Inauguration - Survey Findings

Location of Respondent	Dedicated Network			Speakerphone/Conference 2000			Standard Desk Phone		
	# of People	% of Locations	Total Participation	# of People	% of Location	Total Participation	# of People	% of Location	Total Participation
Head Office	121	(88.3)	346	24	(17.5)	151	24	(17.5)	101
All Regions	132	(93.0)	352	38	(26.8)	169	16	(11.3)	60
-Central Region	26	(100.0)	70	-	-	-	1	(3.8)	1
-S.W. Region	24	(85.7)	63	12	(42.9)	25	7	(25.0)	23
-Eastern Region	30	(90.0)	80	6	(18.2)	41	3	(9.1)	13
-Northern Region	24	(92.3)	65	13	(50.0)	55	1	(3.8)	4
-N.W. Region	28	(96.6)	74	7	(24.0)	48	4	(13.8)	19
Total	253	(90.7)	698	62	(22.2)	320	40	(14.3)	161

Table 23/ Advantages of Audio Teleconferencing*

Number	Percent of Known Users	Comments
216	77.4%	eliminated travel for some participants
141	50.5%	meetings took less time
105	37.6%	able to have more staff attending meetings
87	31.2%	reached a decision or consensus more rapidly
38	13.6%	reduces the number of phone calls
5	1.8%	improves communication
4	1.4%	good method when dealing with specific items
2	0.7%	allows subject to be discussed earlier
2	0.7%	meetings are better organized and more effective
1	0.4%	saves money
1	0.4%	requires less time to get people together

*more than one answer was allowed

Table 24/ Disadvantages of Audio Teleconferencing*

Number	Percent of Known Users	Comments
63	22.6%	lose face-to-face contact, lose non verbal communication -impersonal -often don't know who is speaking
34	12.2%	not suited for all meeting types -document display -demonstration
38	10.0%	requires more meetings to complete business
26	9.3%	tiresome/stressful -requires more intense concentration
26	9.3%	meetings require more preparation
25	9.0%	less indepth discussion and limited amount of topics -does not lend itself to discussion of last minute information -lose discussion often generated at end of meeting or at break time
19	6.8%	equipment problems -poor transmission quality, volume control
13	4.7%	reduces personal travel -enjoy travelling to meetings
11	3.9%	meetings take more time
9	3.2%	increase number of phone calls
5	1.8%	not suited for meetings where new people are involved
4	1.4%	some people are intimidated by the equipment
1	0.4%	harder to get point across
1	0.4%	some places do not have a system

*more than one answer was allowed

Table 25/ Features of Teleconferencing Worthy of Highlighting in Encouraging Use, or For Promotional Purposes*

Number	Percent of Known Users	Comments
92	33.0%	more direct discussion, more organized and efficient -better control by chairperson -more businesslike -less distractions, less superfluous chatter -no straying from agenda -talk to all regions at one time, coordination
35	12.5%	ease of operation, convenience
23	8.2%	meetings previously not possible -more frequent meeting -short notice -meetings where travel hard to justify -emergency meetings -faster contact, simultaneous contact
21	7.5%	savings in time and cost
18	6.5%	more staff able to attend meeting -at home base, access to staff and resources
6	2.2%	less travel

*more than one answer was allowed

Table 26/ Impact on Operations, Impact on Organizational Efficiency

Number	Percent of Known Users	Comments
68	24.4%	no change
54	19.4%	minimal impact
41	14.7%	not enough use made to effect a change
21	7.5%	savings in time and cost
18	6.5%	more efficient information exchange -simultaneous discussion by all parties -on top of issues quicker -improves Head Office - Regional communications
17	6.1%	more efficient use of personal time -more productive, free to do other things -time not spent travelling is spent working on the job
13	2.5%	readily teleconference -have more meetings
7	2.5%	more staff able to attend meetings -fuller representation
1	0.4%	plan meetings more efficiently
1	0.4%	learned to probe more, cannot read audience as well

*more than one answer was allowed

Table 27/ Satisfaction With Audio Teleconferencing as a Means of Communications*

Location of Respondents	Completely Satisfied		Very Satisfied		Somewhat Satisfied		Somewhat Dissatis-fied		Very Dissatis-fied		Completely Dissatis-fied	
	#	%	#	%	#	%	#	%	#	%	#	%
Head Office	14	(10.2)	64	(46.7)	54	(39.4)	5	(3.7)	-	-	-	-
All Regions	5	(3.5)	56	(39.4)	76	(53.5)	3	(2.1)	2	(1.4)	-	-
-Central Region	1	(3.8)	11	(42.3)	13	(50.0)	1	(3.8)	-	-	-	-
-S.W. Region	2	(7.1)	14	(50.0)	12	(42.9)	-	-	-	-	-	-
-Eastern Region	-	-	9	(27.3)	21	(63.6)	2	(6.1)	1	(3.0)	-	-
-Northern Region	1	(3.8)	7	(26.9)	17	(65.4)	-	-	1	(3.8)	-	-
-N.W. Region	1	(3.4)	15	(51.7)	13	(44.9)	-	-	-	-	-	-
Total	19	(6.8)	120	(43.0)	130	(46.6)	8	(2.9)	2	(0.7)	-	-

*Percentages expressed as a percent of respondent's location (row percentage)

Table 28/ Satisfaction With Equipment of Transmission*

Location of Respondents	Completely Satisfied		Very Satisfied		Somewhat Satisfied		Somewhat Dissatis-fied		Very Dissatis-fied		Completely Dissatis-fied	
	#	%	#	%	#	%	#	%	#	%	#	%
Head Office	12	(8.8)	73	(53.3)	41	(29.9)	11	(8.0)	-	-	-	-
All Regions	7	(4.9)	54	(38.0)	61	(43.0)	15	(10.6)	5	(3.5)	-	-
-Central Region	-	-	17	(65.4)	7	(26.9)	1	(3.8)	1	(3.8)	-	-
-S.W. Region	4	(14.3)	8	(28.6)	11	(39.3)	4	(14.3)	1	(3.6)	-	-
-Eastern Region	2	(6.1)	8	(24.2)	19	(57.6)	3	(9.1)	1	(3.0)	-	-
-Northern Region	-	-	9	(34.6)	10	(38.5)	5	(19.2)	2	(7.7)	-	-
-N.W. Region	1	(3.4)	12	(41.4)	14	(48.3)	2	(6.9)	-	-	-	-
Total	19	(6.8)	127	(45.5)	102	(36.6)	26	(9.3)	5	(1.8)	-	-

*Percentages expressed as a percent of respondent's location (row percentage)

Table 29/ Teleconference Usage All Systems - February 1979 to August 1980 - Empirical Findings

Location of Respondent	Number of Teleconferences 1		2		3		4		5		Over 5		Total		Attended Training Session
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
Head Office	94	(53.1)	43	(24.3)	12	(6.8)	13	(7.3)	1	(0.6)	14	(7.9)	177	(100.0)	46
All Regions	96	(46.4)	46	(22.2)	20	(9.7)	13	(6.3)	7	(3.4)	25	(12.1)	207	(100.1)	47
- Central Region	15	(45.5)	8	(24.2)	3	(9.1)	2	(6.1)	1	(3.0)	4	(12.1)	33	(100.0)	16
- S.W. Region	21	(51.2)	4	(9.8)	7	(17.1)	5	(12.2)	-	-	4	(9.8)	41	(100.1)	9
- Eastern Region	26	(53.1)	14	(28.6)	3	(6.1)	1	(2.0)	3	(6.1)	2	(4.1)	49	(100.0)	2
- Northern Region	14	(34.1)	9	(22.0)	4	(9.8)	2	(4.9)	1	(2.4)	11	(26.8)	41	(100.0)	8
- N.W. Region	20	(46.5)	11	(25.6)	3	(7.0)	3	(7.0)	2	(4.7)	4	(9.3)	43	(100.1)	12
Total	190	(49.5)	89	(23.2)	32	(8.3)	26	(6.8)	8	(2.1)	39	(10.2)	384	(100.0)	140

Table 30/ Dedicated Network: Summary

			ESTIMATED SAVINGS*						
			TRAVEL COST ($)				FUEL SAVINGS(L)		
Number of Teleconferences	Total Time Used (Hours: Minutes)	Toll Cost ($)	Transportation Cost	Accommodation Cost	Travel Time ($)	Total Travel Cost	Car	Air	Total Fuel Savings
86	182:20	7 630	48 929	7 735	37 071	93 735	10 930	31 168	42 098
Average per all Teleconferences									
	2:12	89	569	90	431	1 090	127	363	490
Average per Teleconferences That Substituted 2:31 for Travel									
	(Total time 174:00)	98 (Total toll Charges 7 461)	643	102	488	1 233	144	410	554

*Includes only those teleconferences which replaced travel and for personnel who who would have travelled to the meeting - other assumptions as outlined in the appendix were also made.

Table 31/ Dedicated Network: Teleconferencing vs. Travel Cost

	DIRECT SAVINGS* Travel Time Not Included		Total Estimated Travel Savings Including Time Lost Travelling	
Estimated Travel Cost	$56 664	100.0%	$93 795	100.0%
Teleconferencing Charges (Equipment and toll)	$43 652	77.0%	$43 652	46.5%
Teleconferencing Savings	$13 012	23.0%	$50 143	53.5%

*Includes actual transportation costs, accomodation cost and meal allowance

Table 32/ Dedicated Network: Meeting Characteristics

Number of Locations in Teleconferences	Total Number of Teleconferences	Number of Meetings* Where Teleconferencing Did Not Substitute for Travel	Total Attendance at Teleconferences	Total Trips Which Were Avoided
	# %	# %	# %	# %
2	21 (24.5)	9 (42.9)	117 (11.5)	30 (6.5)
3	5 (5.8)	- -	39 (3.8)	8 (1.7)
4	8 (9.3)	- -	142 (14.0)	42 (9.1)
5	29 (33.7)	1 (3.4)	348 (34.3)	159(34.5)
6	23 (26.7)	- -	370 (36.4)	222(48.2)
Total	86 (100.0)	10 (11.6)	1016 (100.0)	461 (100.0)

* row percentage

Table 33/ Dedicated Network: Users

Functions	Number of Teleconferences	Percentage
Operations Committee - Subcommittees	31	36.0%
Engineering	20	23.3%
Personnel (includes MEG, Affirmative Action)	12	14.0%
Special Requests/Demonstration/ Testing	6	7.0%
Environmental	3	3.5%
Administrative Managers	3	3.5%
Communications	2	2.3%
Deputy Minister's Office	2	2.3%
Miscellaneous	7	8.1%
Total	86	100.0

Table 34/ Speakerphone: Summary

			ESTIMATED SAVINGS*						
			TRAVEL COST ($)				FUEL SAVINGS(L)		
	Total Time Used (Hours: Minutes)	Toll Cost ($)	Trans-porta-tion Cost	Accom-modation Cost	Travel Time ($)	Total Travel Cost	Car	Air	Total Fuel Savings
24	8:00	N.A.	818	140	432	1 390	26	366	392
Average per all Teleconferences (24)	0:20	N.A.	34	6	18	58	1	15	16
Average per Teleconferences That Substituted for Travel (2)	0:35 (Total time 1:10)	N.A. N.A.	409	70	216	695	13	183	196

*Includes only those teleconferences which replaced travel and for personnel who would have travelled to the meeting - other assumptions as outlined in the Appendix were also made.

Table 35/ Conference 2000: Summary

			ESTIMATED SAVINGS*						
			TRAVEL COST ($)				FUEL SAVINGS(L)		
	Total Time Used (Hours: Minutes)	Toll Cost ($)	Trans-porta-tion Cost	Accom-modation Cost	Travel Time	Total Travel Cost	Car	Air	Total Fuel Savings
14	10:52	N.A.	1 586	280	990	2 856	212	912	1 124
Average per all Teleconferences (14)	0:45	N.A.	113	20	71	204	15	65	80
Average per Teleconferences That Substituted for Travel (6)	0:58 (Total time 5:51	N.A. N.A.	264	47	165	476	35	152	187

*Includes only those teleconferences which replaced travel and for personnel who would have travelled to the meeting - other assumptions as outlined in the Appendix were also made.

FIGURES

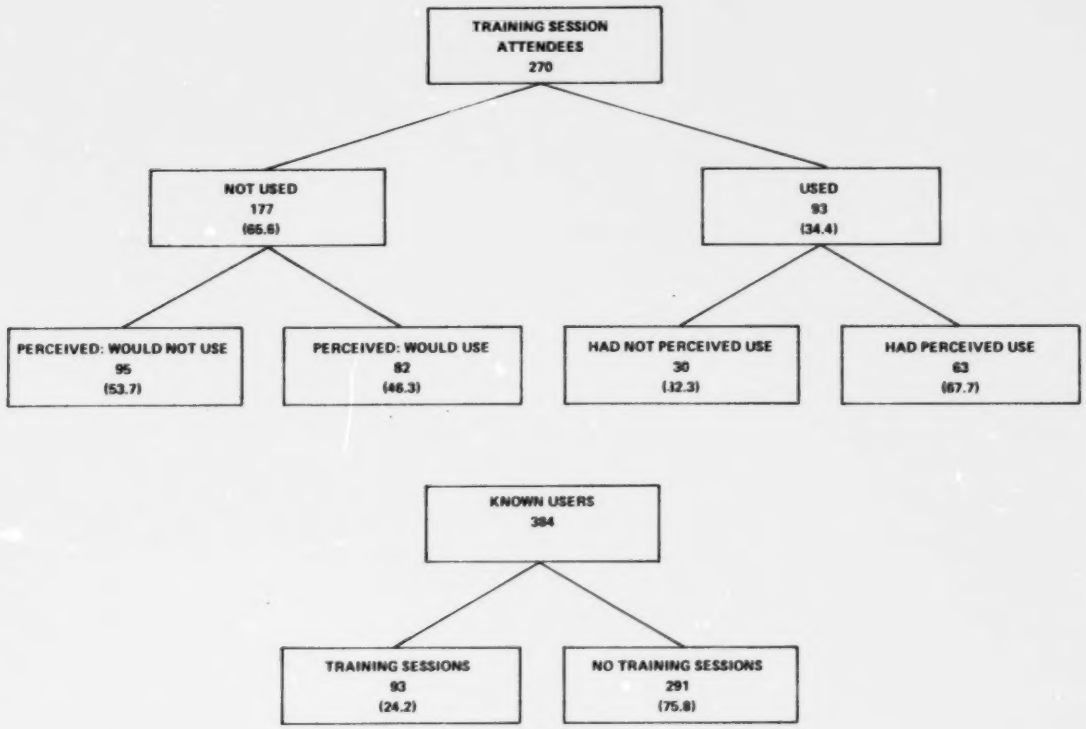

TRAINING SESSION ATTENDEES 270
NOT USED 177 (65.6)
USED 93 (34.4)
PERCEIVED: WOULD NOT USE 95 (53.7)
PERCEIVED: WOULD USE 82 (46.3)
HAD NOT PERCEIVED USE 30 (32.3)
HAD PERCEIVED USE 63 (67.7)
KNOWN USERS 384
TRAINING SESSIONS 93 (24.2)
NO TRAINING SESSIONS 291 (75.8)

Figure 1/ Teleconferencing Usage and Training Session Participation

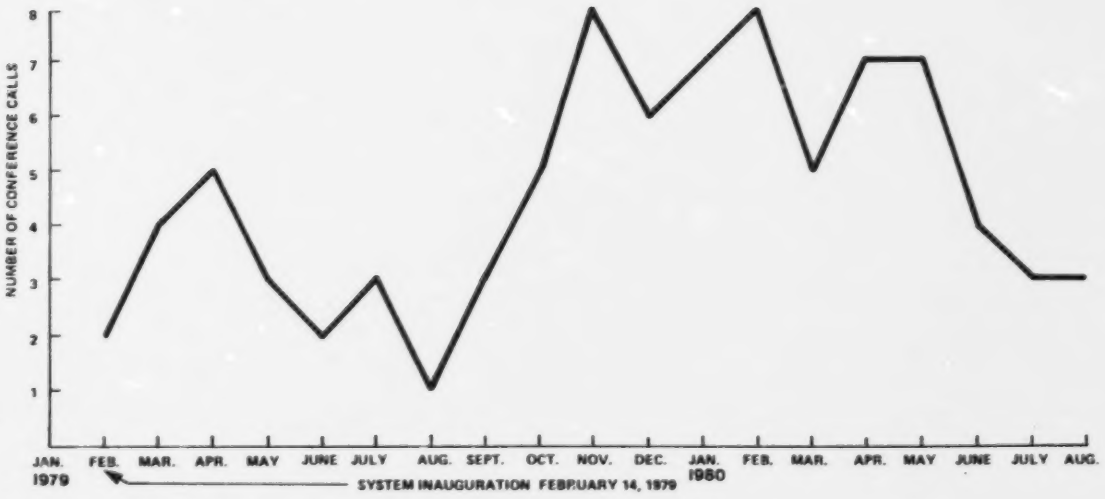


Figure 2/ Dedicated Network: Monthly Usage

APPENDIX

Appendix 1/ Assumptions for Determining Travel Costs and Energy Savings

- o Calculated only for the teleconferences which substituted for travel and excludes those individuals identified on the usage forms as non-essential or observers to the meeting.
- o All meetings would have taken place in Downsview.
- o Travel from Thunder Bay and North Bay were by air.
  - Thunder Bay travel by 727 (1837.7 available seat km/100L)*
  - North Bay travel by small DC-9 (1125.4 available seat km/100L)*
  - Fuel savings includes travel to and from airport (13.7L per origin, per trip)
- o Travel from other locations was by automobile and to minimize cost, carpooling was assumed (584.1 km/100L- rate $0.15 per km)
- o Transportation cost includes actual dollars spent travelling and meals.
- o Accomodation costs were estimated based on $35 per day. A selected proportion of trips per location were estimated to be overnights. These estimates were subjectively based on Regional Coordinator's observation and knowledge of trip patterns.
- o Total travel costs include travel cost and an estimated salary loss due to time lost while travelling (based on a $34,000 per year average salary).

* adapted from Glenn, C.H. "Possible Impact of Petroleum Shortages on Canadian Air Transportation". Paper presented to the Institute of Combustion and Fuel Techonology of Canada, Toronto, April 22, 1976.

Appendix 2/ Introductory Letter/Major Survey Questionnaire

Ministry of Transportation and Communications

Ontario

Memorandum

To: Selected Participants

From: J. R. Barr
Assistant Deputy Minister
Finance and Administration

Attention:

Date: 1980 07 04

Our File Ref.

In Reply to

Subject: Evaluation of Audio Teleconferencing

The audio teleconferencing program in this Ministry was officially inaugurated 1979-02-04 with the expectation that teleconferencing would be a useful tool for improving communication amongst offices and reducing the need for travel. As part of the continuing evaluation of the program, the Human and Social Research Group in the Policy Planning and Research Division is conducting a survey. This survey has two main objectives:

1. To determine the extent of usage and level of satisfaction with various conferencing modes.

2. To determine the awareness and potential for future usage.

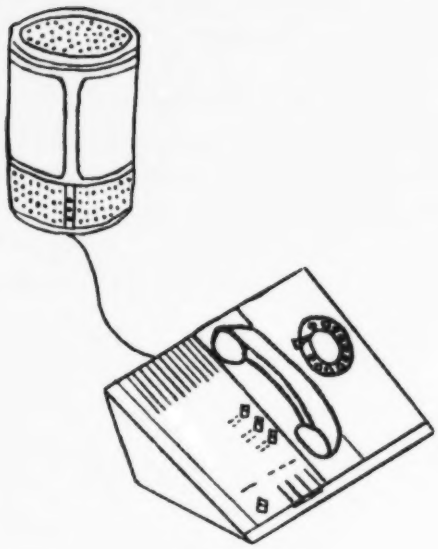
You have been specially selected to assist in this evaluation. The attached questionnaire should be self-explanatory, however, if you have any difficulties with any of the questions please contact Mr. Paul Gorys, 248-7191 Downsview, for assistance. The completed questionnaires should be returned to Mr. Gorys by August 1. The evaluation of this experimental program requires your full cooperation.

J.R. Barr

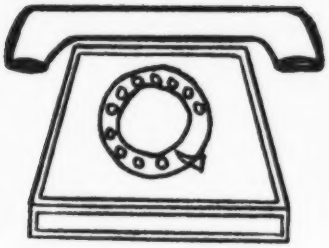
Attached/

Return Address: Mr. Paul Gorys
Human and Social
Drivers & Vehicles Research
Room 324, Central Building
Downsview

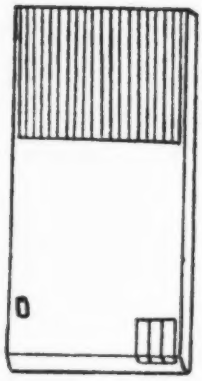
TELECONFERENCING EQUIPMENT



CONFERENCE 2000 (R)



REGULAR
TELEPHONE
NETWORK



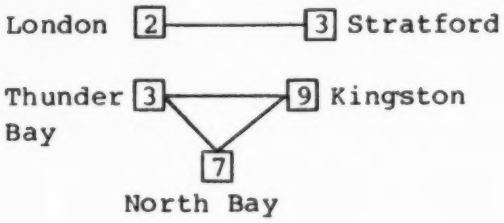
SPEAKERPHONE (R)

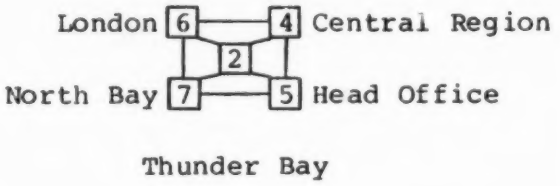
DEDICATED
NETWORK

NAME _____ OFFICE _____ 1 2 3

LOCATION 1. Head Office; 2. Central Region; 3. London; 4. Kingston; 5. North Bay; 6. Thunder Bay. 4

Teleconferencing is defined as any situation where three or more individuals communicate simultaneously, as a group, over an electrical telecommunications channel. Some schematic examples of teleconferencing are given below





1. At this moment do you feel you have enough knowledge about teleconferencing to actually arrange a conference utilizing various teleconferencing equipment? Please check the appropriate box.

	CNCP Dedicated Network	Speaker Phone or Conference 2000	Desk Phone
(a) YES, No problem at all	☐	☐	☐
(b) YES, would require some instruction	☐	☐	☐
(c) NO, would require more information	☐	☐	☐
(d) NO, not at all	☐	☐	☐

5 6 7

2. Within MTC, how would you go about arranging a teleconference or obtaining information on teleconferencing?
Comment _____
_____ 8 9

Don't know ☐

3. In an average year how many meetings do you attend where travel is involved for any of the participants at the meeting?

Number of Meetings	
Head Office-Regions	_____
Head Office-Districts	_____
Regions-Regions	_____
Regions-Districts	_____
Other	_____

10 11 12 13 14 15 16 17 18 19

4. How many of these meetings could be substituted for by teleconferencing?

	Number of Meetings
Head Office-Regions	
Head Office-Districts	
Regions-Regions	
Regions-Districts	
Others	

5. How many teleconferencing meetings do you feel you will be involved in, in the next year? _____

6. Have you used teleconferencing? 1. YES ☐
   2. NO ☐

   if no, why not _____

7. What types of things would encourage you to either make a conference call, or enable you to make better use of the various teleconferencing systems?
   - more information, detailed instruction ☐
   - greater accessibility of equipment ☐
   - higher transmission quality ☐
   - different equipment, greater equipment capabilities ☐
     specify: _____
   - other _____

8. What is your job title?
   1. Executive Director ☐
   2. Director ☐
   3. Manager ☐
   4. Coordinator, Administrator ☐
   5. Head, Supervisor ☐
   6. Other ☐

9. Would you like to be contacted by someone who will provide you with more information on teleconferencing?
   1. YES ☐
   2. NO ☐

The next section of the questionnaire is to be completed by users of teleconferencing. The questionnaire concludes at this point for non-users. Thank you for taking the time out to complete this questionnaire.

10. Since February 1979, which of the following teleconferencing systems have you used.

	Please Check	# of times
Dedicated Network	☐	_____
Speaker phone or Conference 2000	☐	_____
Standard Desk Phone	☐	_____

11. (a) In general, for the teleconferencing meetings you attended, what were the advantages of teleconferencing (please check appropriate boxes or make comment).

- reduces number of phone calls ☐
- eliminated travel for some participants ☐
- able to have more staff attend meeting ☐
- reached a decision or concensus more rapidly ☐
- meetings took less time ☐
- other (specify) _____

_____

(b) In general, what were the disadvantages of teleconferencing?

- increases number of phone calls ☐
- reduces personal travel (enjoy travelling to meetings) ☐
- tiresome ☐
- meetings took more time ☐
- required more meetings to complete business ☐
- other (specify) _____

_____

12. Overall, what features of teleconferencing did you find most appealing, i.e., what features would you highlight in trying to get someone else to use the system.

Comment _____

_____

13. What impact has teleconferencing made on your operations or organizational efficiency?

Comment _____ 69 70

_____ 71 72

14. In general, how satisfied are you with teleconferencing as a means of communication?

1. Completely satisfied
2. Very satisfied
3. Somewhat satisfied
4. Somewhat dissatisfied
5. Very dissatisfied
6. Completely dissatisfied

73

Comment _____ 74 75

15. In general, how satisfied are you with the equipment or transmission?

1. Completely satisfied
2. Very satisfied
3. Somewhat satisfied
4. Somewhat dissatisfied
5. Very dissatisfied
6. Completely dissatisfied

76

77 78

Comment _____

Thank you for your cooperation in completing this questionnaire.

memorandum

Ontario

To:

Date: 1980-07-23

From: Paul Gorys
Drivers & Vehicles Research
Room 324, Central Building
Downsview

Re: Evaluation of Audio-Teleconferencing

On 1980-07-04 a memorandum signed by John Barr and a questionnaire was distributed to you. You were specially selected to participate in this evaluation. This memorandum is sent as a reminder to complete and forward the questionnaire before August 1, 1980.

If you have completed and returned a questionnaire, inform either myself or your regional coordinator. We have received a few questionnaires without names and will try to identify yours. In the event you have either never received a questionnaire or misplaced it, a copy is attached to this memo for you.

Thank you very much for your assistance and cooperation in this matter.

Paul Gorys

Paul Gorys

Appendix 3/ Definitions

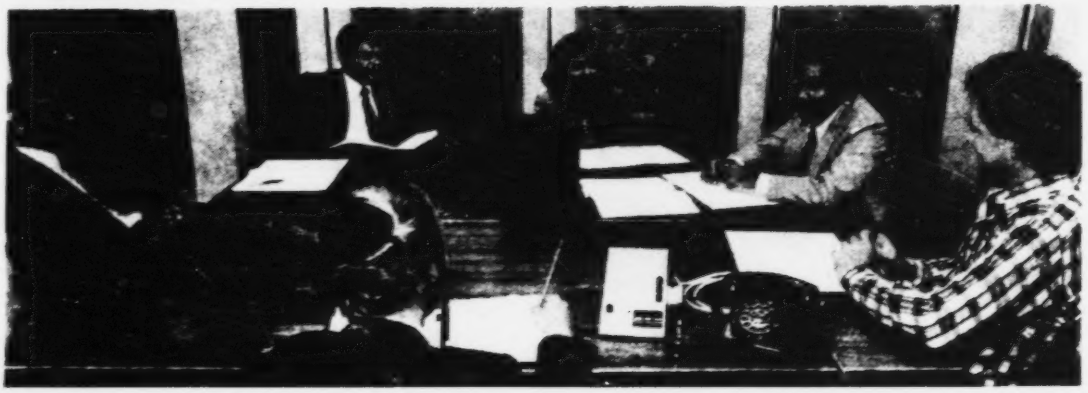
SPEAKERPHONE - This device is a hard-wired addition to a standard telephone set. Its function is to eliminate the need to hold the telephone handset during a conversation by replacing the telephone transmitter with a voice activated microphone and loudspeaker. The telephone can still be used normally when so desired or the speakerphone can be enabled with the push of one button.

CONFERENCE 2000 - This device is basically a larger scale speakerphone. It is designed to be located in the centre of a boardroom table and provide large group teleconferencing (2-8 participants per location).

DEDICATED NETWORK - This refers to a high quality studio set-up for audio teleconferencing among specially modified boardrooms located in a number of cities. This system consists of units incorporating speaker and microphone for each participant located in each designated conference room. The equipment is manufactured by Philips; however, the system is supplied by CNCP telecommunications who provide the interface equipment and broadband communications network.

Appendix 4/ Photographs of Audio Teleconferencing Systems

Conference 2000



Dedicated Network System

Speakerphone